

The 2009 International Building Code An overview of the structural changes—Part 1

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The International Code Council (ICC) uses an 18-month code development cycle and a three-year code publication cycle. This means a new code is published every three years with one supplement published between code editions. Thus, the successful code changes during the 2006/2007 cycle were published in the 2007 Supplement to the International Building Code (IBC). The successful code changes proposed during the 2007/2008 cycle are then combined with the changes in the 2007 Supplement to produce the new 2009 edition of the IBC.

There were more than 350 proposed code changes to the structural provisions in Chapters 16 through 23 of the 2006 IBC. Of these proposed code changes, approximately 200 were successful and will be incorporated into the 2009 edition of the IBC. The code changes vary in significance from minor editorial clarifications to substantive technical revisions or additional provisions. This article presents a brief overview of the more significant structural changes in the 2009 IBC. For a complete history of all the successful code changes, refer to the 2009 IBC Code Changes Resource Collection, which is expected to be available from the ICC at www.iccsafe.org in the spring of 2009. This publication contains the initial code change proposal, committee action, amendments, public comments, and the final action of the assembly during the final code change hearings.

This article is presented in two parts: changes to Chapter 16 and 17 are presented here and changes to Chapters 18-23 will be published in Part 2 in the April issue of **Structural Engineer**.

Chapter 16—Structural Design

The most significant changes to Chapter 16 are the new structural integrity requirements for high rise buildings classified in Occupancy Category III and IV in new Section 1614, and the new simplified alternate all heights wind design method based on the 2005 American Society of Civil Engineers/Structural Engineering Institute's Minimum Design Loads for Buildings and Other Structures (ASCE 7-05) Method 2 analytical procedure in Section 1609.6. Many changes were made to Chapter 16 that may not be considered significant, but code users should be aware of the importance of these as well. For example, an outdated provision in the code that allowed a one-third stress increase for allowable stress design of handrails and guards was deleted because of new strength design methods. Some of the important, but less significant changes are discussed below.

Changes were made to Occupancy Category III and IV buildings in Table 1604.5 to align the description of occupancy classifications with those used in the non structural provisions.

Section 1604.8.2—The requirement that concrete and masonry walls be anchored to floors and roofs that provide lateral support for the wall for a minimum strength level horizontal seismic force of 280 pounds per linear foot (plf) was replaced with a reference to the minimum design strength required by ASCE 7-05 Section 11.7.3. The code language now requires all walls, not just concrete and masonry walls, to be anchored to floors, roofs, and other structural elements that provide lateral support for the wall.

Section 1604.8.3—The code now addresses the condition where the load on a cantilevered portion of a deck span could produce uplift at the back-span support and added snow load since it is conceivable that snow load could control the design of the deck.

Section 1605.1.1—The code now permits soil resistance and strength reduction factors to be considered where strength design factored loads are used in foundation design.

Section 1605.3—The two sets of allowable stress design load combinations now prescribe that roof live loads of 30 pounds per square foot (psf) or less need not be combined with seismic loads.

Table 1607.1—Decks and balconies now use the same live load as the occupancy they serve, and the previous distinction between decks and balconies was removed by deleting their definitions.

Section 1607.7.3—The point of application of passenger vehicles loading for barrier design in parking garages was modified and a second loading condition was added based on actual bumper height data of modern passenger vehicles.

Section 1607.9.1.1—A KLL factor was added to Table 1607.9.1 for one-way slabs to be consistent with Table 4-2 of ASCE 7-05. The live load reduction requirements for one-way slabs was changed from a general prohibition on live load reduction (except for heavy live loads) to a limit on the tributary area, AT, to be consistent with Section 4.8.5 of ASCE 7-05.

Section 1609.1.2—The prescriptive use of the wood structural panels in lieu of impact-resistant glazing or impact-resistant covering is now limited to only Group R-3 and R-4 occupancies, which is consistent with the intent of ASCE 7-05 to provide a higher level of protection for non residential occupancy groups.

Section 1609.1.1.1—The reference to the outdated ICC legacy Standard SSTD 10–99 was replaced with a reference to the new ICC–600 Standard for Residential Construction in High Wind Regions.

Section 1609.1.2.2—A new reference to the ANSI/DASMA 115 Standard Method for Testing Garage Doors and Rolling Doors specifically addresses testing for windborne debris resistance of glazed openings in garage doors.

Section 1609.1.1.2—The recommendations pertaining to lower limits on pressures determined by wind tunnel testing from the ASCE 7-05 commentary were incorporated directly into the code so they are now enforceable.

Section 1611.1, Figure 1611.1—Design rainfall intensity maps were added to accompany the design requirements for rain loads.

Section 1613.7—Section 11.7.5 of ASCE 7-05 was amended to replace the minimum prescribed strength level horizontal seismic force of 280 plf with the minimum design strength required by Section 11.7.3 of ASCE 7-05.

Section 1607.11.2.2—The code now specifically prohibits live load reduction for live loads of 100 psf or more at areas of roofs classified as Group A occupancies.

Section 1613—ASCE 7-05 is referenced in the 2009 IBC for structural loads, including Supplement No. 2, which revises the minimum base shear equation for both buildings and non-building structures where the equivalent lateral force procedure is used.

Section 1613.6.3—Automatic sprinkler systems installed in accordance with the 2007 edition of NFPA 13 Standard for the Installation of Sprinkler Systems are deemed to comply with the ASCE 7-05 seismic bracing provisions.

Section 1613.6.4—Seismic design coefficients and limitations for autoclaved aerated concrete (AAC) masonry (ordinary reinforced) shear wall systems were added that extend the use of these systems to seismic applications in Seismic Design Category B and C.

Section 1613.6.6—An alternative to ASCE 7-05 Section 12.2.5.4 permits the height of Special Steel Plate Shear Wall systems to be increased from 160 feet to 240 feet for structures in Seismic Design Categories D or E, and from 100 feet to 160 feet for structures in Seismic Design Category F.

Section 1613.6.7—The seismic separation requirements in prior editions of the IBC were not included in ASCE 7-05. The provisions establishing minimum separation distance between adjoining buildings which are not structurally connected have been restored in the 2009 IBC.

Section 1613.6.8 — The exemptions from seismic bracing requirements of Section 13.6.7 of ASCE 7-05 was extended to include small ducts where the component factor, $I_p = 1.5$.

Chapter 17—Structural Tests and Special Inspections

Section 1704.1—A significant change to Chapter 17 is the exemption for special inspection of Group R-3 occupancies was deleted and the requirements pertaining to special inspector qualifications were clarified. In high seismic areas, Group R-3 occupancies often have structural elements and systems that require special inspection.

Sections 1704.3.4, 1704.6.2—Two new sections require the special inspector to verify that temporary and permanent bracing are installed in accordance with the approved truss submittal package for both cold-formed steel and wood trusses spanning 60 feet or greater. **Section 1704.4, Table 1704.4**—Continuous special inspection is required for cast-in-place bolts in concrete where allowable loads have been increased for allowable stress design or where strength design is used, and periodic special inspection is required for post-installed anchors in hardened concrete.

Section 1704.10—Special inspection requirements were added for helical pile foundations that are now included in Chapter 18.

Section 1706—A new section is added that requires special inspection for wind resistance that applies to buildings sited in high wind areas based on wind speed and exposure category.

Section 1707.4—The exemption from special inspection of wood light frame construction where the fastener spacing of the sheathing is more than 4 inches on center was extended to apply to cold-formed steel light frame construction as well.

Conclusion

Some of the referenced structural standards in the 2009 IBC have been updated and some are the same as in the 2006 IBC. Part 2 of this article will include a table that shows a comparison of the main structural standards referenced in the 2006 and 2009 IBC.

Additionally, the 2007 Supplement to the IBC, which is included in the 2009 IBC, is available for download at www.iccsafe.org/cs/codes/2007-08cycle/2007Supplement/index.html.

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